

May 18, 2007

To: Joe Karkoski, Senior Land and Water Use Analyst

From: Debra Denton, Environmental Scientist

Subject: Comments Methodology for Derivation of Pesticide Water Quality Criteria for Protection of Aquatic Life in the Sacramento and San Joaquin River Basins. Phase II Report

I appreciate the opportunity to review and comment on the Methodology for Derivation of Pesticide Water Quality Criteria for Protection of Aquatic Life in the Sacramento and San Joaquin River Basins Phase II Report (report). Overall, the document is well prepared and written. The exhaustive review of the literature on criteria development as discussed in this report would be extremely valuable to most States in developing criteria. I highly applaud Drs. TenBrook and Tjeerdema for their exhaustive review and thorough analyses in new areas such as the development of assessment factors. One point in particular, I believe will go a long way in deriving either regulatory water quality criteria and developing TMDL numeric targets is the clear and transparent process of reviewing data for its relevance, acceptance and documentation to be considered and reviewed in deriving an individual criteria. I am submitting my technical comments on the technical merits of this report and acknowledge a later date, EPA water quality standards would be additional reviews when the Regional Board has proposed the methodology for their consideration.

## Chapter 2: Evaluation and Selection of Methods

- Section 2.1.1.2, EPA agrees that when using NOEC data that a consideration of the summary statistic metric, minimum significant difference (MSD) or PMSD should be reported as a measure of within-test variability. I suggest adding the following references to support this (USEPA 2000; Denton et al., 2003). EPA (2000) provides a recommendation to implement and evaluate MSD when using hypothesis driven techniques along with power and effect size analyses in Appendix B.
- Section 2.1.1.3, Recognizing this is not an exhaustive list for discussion on nontraditional endpoints, I would suggest additional discussion on biomarker's such as stress proteins which have been linked to abnormal development and larval sturgeon and energetic studies

which have demonstrated an increase in energy expenditure to juvenile steelhead trout as discussed in Oros and Werner (2005).

- Section 2.1.1.5, I agree for those pesticides with log  $K_{ow}$ s, between five and seven that feeding routines should be minimized in order to avoid interactions with food particles.
- Section 2.2.1.2, I agree that the inclusion of EPA's interspecies correlation estimation software be included for this new methodology to address the potential effects with threatened and endangered species.
- Section 2.3.5.2, the discussion on pesticide mixtures are known as well studied, I suggest adding the reference Lydy et al. (2004) which provides an exhaustive literature review of known pesticide to pesticide mixture interactions. I agree with the statement that there is really no way to derive criteria for all the potential mixtures of pesticides that would occur in a waterbody. Therefore, the Central Valley Regional Board 's approach of applying their Basin Plan's additivity formula (toxic unit approach detailed in 3.5.2.1.1) provides a valid approach when dealing with known pesticides located in a given water body. As has been done successfully in the development of the joint diazinon and chlorpyrifos TMDLs for the San Joaquin River, Sacramento and Feather Rivers and Delta.
- Section 2.4, I agree that having a systematic way of reviewing ecotoxicity data and having a detailed data summary table are paramount to rating the quality of a given study including all the factors listed in this section and provided in Figure 3.3.
- Section 2.5.2, I agree that evaluating ecotoxicity data on the three areas of relevance, documentation and acceptability are crucial to criteria development. This point alone will go a long way in having less contentious criteria development, if it is clear that the data being considered has met these factors and therefore should be included in the database for that individual pesticide criteria document.
- Section 2.6, I agree that the minimum taxonomic requirements need to be specified for the minimum data sets.
- Section 2.3.2.1, I agree with the statement, "Criteria must be protective of aquatic life, and therefore must err on the side of conservatism when data are lacking." This section discussing the application of assessment factors for those data sets that do not meet the minimum data requirements to derive criteria using the SSD approach is most likely necessary, especially in light of the fact that there are fewer pesticide criteria and numerous pesticides which are used and potentially found in water bodies. Therefore, the need exists in the regulatory process in which to establish criteria with fewer data points and is recognized in other countries methodology is cited in Table 2.5.
- Section 3.2.1, Providing a table with examples of sources is very helpful for the pesticide review process, and recognizing this is not an exhaustive list, however, I would consider adding USDA's chem finder database in Table 3.1.
- The methodology steps are clearly expressed based on the supporting technical information in Chapter 2.
- The methodology expresses the criteria in magnitude, duration and frequency components consist with existing USEPA 1985 guidelines.

Any questions or further discussions, please call me at 916-341-5520 or [denton.debra@epa.gov](mailto:denton.debra@epa.gov).

Sincerely,

Debra L Denton, PhD  
Environmental Scientist

cc: Matt Mitchell, USEPA Region 9 Permits and Standards

Reference:

Denton DL, Fox JF, Fulk FA. 2003. Enhancing toxicity test performance by using a statistical criterion. *Environ Toxicol Chem* 22(10):2323-2328.

Lydy MJ, Belden JB, Wheelock CE, Hammock BD, Denton, DL. 2004. Challenges in regulating pesticide mixtures. *Ecology and Society*. 9(6):1.

Oros DR, Werner I. Pyrethroid Insecticides: And Analysis of Use Patterns, Distributions, Potential Toxicity and Fate in the Sacramento-San Joaquin Delta and Central Valley. White paper for Interagency Ecological Program, Department of Water Resources.

U.S. Environmental Protection Agency. 2000. *Understanding and accounting for method variability in whole effluent toxicity applications under the National Pollutant Discharge Elimination System Program*. Eds: Denton DL, Fox J, Fulk FA, Greenwald K, Narvaez M, Norberg-King TJ, Phillips L. EPA/833/R-00-003. Office of Water. Washington, DC.